

Claims

1. A method of forming a coating layer of an intermetallic compound on a base material, comprising
5 the steps of:

piling up a first substance on a base material,
and

delivering a second substance onto the first substance,

the second substance reacted with the first substance to thereby form a coating layer of an intermetallic compound on the base material.

2. A method of welding a plurality of base materials
15 to each other with an intermetallic compound,
comprising the steps of:

piling up a first substance on the base materials,
and

delivering a second substance onto the first
20 substance,

the second substance reacted with the first substance to thereby cause the plurality of base materials to be bonded to each other through a coating layer of an intermetallic compound.

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3. The method as claimed in claim 1 or 2, wherein a building up coating layer is formed on a base material surface, the building up coating layer being fused to the base material.

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4. The method as claimed in claim 1 or 2, wherein the first substance is constituted of at least one metal selected from the group consisting of nickel, cobalt, iron, niobium, vanadium, molybdenum, tungsten, chromium and tantalum.

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5. The method as claimed in claim 1 or 2, wherein the second substance is constituted of at least one metal selected from the group consisting of aluminum and titanium.

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6. The method as claimed in claim 1 or 2, wherein the base material or base materials are constituted of a substance which is a metal or alloy of at least one member selected from the group consisting of iron, nickel, cobalt, aluminum and niobium.

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7. The method as claimed in claim 1 or 2, wherein the base material or base materials are constituted of a substance which is at least one metal selected from the

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group consisting of metals of the first substance and the second substance, or a metal homologous thereto.

8. The method as claimed in claim 1 or 2, wherein the
5 first substance is piled up in powdery form or molten form on the base material or base materials, and the second substance is delivered in molten form or powdery form onto the piled first substance, provided that at least one of the first substance and the second
10 substance is in molten form.

9. The method as claimed in claim 1 or 2, wherein the first substance contains a ceramic.

15 10. The method as claimed in claim 1, 2 or 9, wherein the first substance is in powdery form or molten form and contains a powdery or fibrous ceramic constituted of an oxide, carbide, nitride or boride of at least one metal selected from the group consisting of aluminum, yttrium, titanium, zirconium, hafnium and silicon.
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11. The method as claimed in claim 1 or 2, wherein a coating layer constituted of an intermetallic compound, an intermetallic compound having a ceramic dispersed
25 therein, or an intermetallic compound containing a

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nitride is formed by the reaction between the first substance and the second substance.

12. A method of preparing a three-dimensional molding
5 with the use of a computerized control system,
comprising the steps of:

piling up a portion of first substance on a base material, and delivering a portion of second substance onto the piled first substance to thereby form a layer of intermetallic compound; and

piling up another portion of first substance on the intermetallic compound layer, and delivering another portion of second substance onto the piled first substance to thereby form another layer of intermetallic compound.

13. A coating apparatus for forming a coating layer of intermetallic compound on a base material by the use of a reaction between a first substance and a second substance, which coating apparatus comprises:

a unit for piling up a first substance on a base material,

a unit for delivering a second substance onto the first substance, and

$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{x}} \right) = \frac{\partial L}{\partial x}$

a unit for melting at least one of the first substance and the second substance.

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